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From:

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To:

Mr. David A Vanore
cc. Mr. John R. Lee
United States Patent and Trademark Offices
Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Date: September 23, 2004

Application No: 10/764,252
Art Unit: 2881

Re: Action Letter of August 24, 2004

Dear David,

Attached please find (1) Reply A To Action of August 24, 2004; (2) Amendment B; and (3) Remarks.

Please use the amended Claims and renumbering the claims.

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Best regards,

Yang Wang
(Yang Wang)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Yang Wang
Serial No. : 10/764,252
Filed : 01/23/2004
Title : ION TRAP MASS SPECTROMETRY

Art Unit : 2881
Examiner : David Vanore

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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REPLY A TO ACTION OF AUGUST 24, 2004

Dear Commissioner:

Responsive to the office action dated August 24, 2004, application owner respectfully traverses the requirement for restriction and provisionally elects species III which includes claims 3, 29, 33, 37, 41, 42, 43, 47, 48 and 49 for further prosecution in this application.

35 U.S.C. 121 reads, "If two or more independent and distinct inventions are claimed in one application, the Commissioner may require the application to be restricted to one of the inventions." Thus, restriction is proper only if the inventions are "independent and distinct." M.P.E.P. headed 802.01, "Meaning of 'Independent', 'Distinct' reads as follows:

INDEPENDENT

The term "independent" (i.e., not dependent) means that there is no disclosed relationship between the two or more subjects disclosed, that is, they are unconnected in design, operation or effect, for example, (1) species under a genus which species are not usable together as disclosed or (2) process and apparatus incapable of being used in practicing the process.

DISTINCT

The term "distinct" means that two or more subjects as disclosed are related, for example as combination and part (subcombination) thereof, process and apparatus for its practice, process, and product made, etc., but are capable of separate manufacture, use or sale as claimed, AND ARE PATENTABLE (novel and unobvious) OVER EACH OTHER (though they may each be unpatentable because of the prior art). It will be noted that in this definition the term "related" is used as an alternative for "dependent" in referring to subjects other than independent subjects.

The examiner has not shown that the claims in each species "ARE PATENTABLE (novel and unobvious) OVER EACH OTHER." Should the requirement for restriction be made final, the examiner is respectfully requested to rule that the claims in each species "ARE PATENTABLE (novel and unobvious) OVER EACH OTHER."

The examiner has made no showing whatsoever that the inventions are INDEPENDENT. M.P.E.P. 803 provides, "If the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to distinct or independent inventions."

And M.P.E.P. 803.01 provides, "IT STILL REMAINS IMPORTANT FROM THE STANDPOINT OF THE PUBLIC INTEREST THAT NO REQUIREMENTS BE MADE WHICH MIGHT RESULT IN THE ISSUANCE OF TWO PATENTS FOR THE SAME INVENTION."

The main inventive concept of this application is a non-linear (three-dimensional or two-dimensional) ion trap mass spectrometry. Furthermore three other dependent important concepts are: a) switching the ion trap between a three-dimensional mode and a two-dimensional mode by cutting the ring electrode into and operating on the multiple pieces; b) superimpose a DC octopole field on a main quadrupole field by cutting the cap electrodes into and operating on multiple pieces, c) operating the ion trap for ion mass analysis. These concepts work together to provide a complete analysis solution.

Specifically, two further ion trap structures are disclosed implementing abovementioned concepts:

I: A multiple electrodes ion trap which generates a DC octopole field being superimposed on the main RF quadrupole field. When operating as a three-dimensional ion trap, DC octopole field is constructed by cutting two cap electrodes. When operating as two-dimensional ion trap, DC octopole field is constructed by adding a set of small rods electrodes. With disclosed various operating methods and electronics layouts, the mass-ion can be analyzed and mass resolution can be improved, especially, when the ion trap structure and its operating method operate in lower vacuum conditions of 10^{-2} - 10^{-1} mbar.

II: A multiple electrodes ion trap which includes symmetrically cutting, in parallel to its central axis, ring electrodes. This ion trap can generate a three-dimensional ion trap or a two-dimensional multipole ion trap with various disclosed electronics layouts. With disclosed electronics designs, the ion trap can operate and switch in-between a three-dimensional mode and a two-dimensional multipole mode, which improves the ions trapping efficiency.

Species I claims the main inventive concept embedded in structure I in general. Species III claims a three-dimensional ion trap version and mass-analysis method to realize structure I. Species IV claims another three-dimensional ion trap to realize structure I. Species V claims a two-dimensional ion trap version and mass-analysis

method to realize structure I. Species VIII claims the electronics layouts for generating DC octopole field in structure I. Species VII claims a classical ion trap which is operated under lower vacuum condition of 10^{-2} - 10^{-1} mbar.

Species II claims the structure II in general. Species VI claims the specific embodiments to realize structure II. Species IX claims another embodiment to realize structure II.

Manifestly, search and examination of the entire application can be made without serious burden because patents related to the claimed species are coherently connected and related to the same main fundamental inventive concept and its two specific structures implementing the main inventive concept. Accordingly, it is respectfully requested that the requirement for restriction be withdrawn. If the requirement for restriction is repeated, the examiner is respectfully requested to rule that all the different species ARE PATENTABLE (novel and unobvious) OVER EACH OTHER and explain why all the claims cannot be examined without serious burden.

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